techniques.

24. (Canceled) The method of claim 1, wherein the second barrier layer is deposited to a thickness of about 400 Å.

REMARKS

This is intended as a full and complete response to the Final Office Action dated June 29, 2000, having a shortened statutory period extended two months for a response set to expire on November 29, 2000. Claims 1-8, 11-18, and 20-24 were considered and stand rejected. Applicants propose canceling claims 1-8 11-14, 20, 22, and 24 without prejudice. Applicants assert no new matter has been introduced in this amendment and that the proposed amendments place the application in condition for allowance or at least reduce the issues for Appeal. Entry of the amendment is respectfully requested.

Claims 15-18 and 23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Taguchi et al.* in view of *Tseng et al.* The Examiner has stated that it would have been obvious to modify the titanium and aluminum deposition process of *Taguchi et al.* with the polysilicon plug formation process of *Tseng et al.* to deposit a first barrier layer over a blanket dielectric layer and then form a via hole through the barrier layer and the dielectric layer prior to deposition of a second barrier layer. Applicants respectfully traverse the rejection.

Taguchi et al. discloses deposition of a first barrier layer on the sidewalls of a hole in order to reduce oxidation of a second barrier layer of titanium and provide an improved wetting surface for aluminum fill of a hole. *Taguchi et al.* teaches conformal deposition of the second barrier layer on the bottom and sidewalls of the feature and requires the formation of two barrier layers on the sidewalls of a hole. *Taguchi et al.* does not teach, show, or suggest forming a feature through a barrier layer formed on a dielectric layer and through the dielectric layer. *Taguchi et al.* does not teach, show, or suggest depositing a second barrier layer on the bottom and sidewalls of the feature and removing the second barrier layer formed at the bottom of the feature prior to depositing a metal layer.

Tseng et al. discloses the formation of a polysilicon plug by depositing a first barrier layer over a blanket dielectric layer, forming a feature through the barrier layer and the dielectric layer to expose an underlayer, depositing a polysilicon fill layer in the feature, and removing the barrier

layer from the blanket dielectric layer prior to deposition of a metal layer. *Tseng et al.* does not teach, show, or suggest depositing a second barrier layer on the bottom and sidewalls of the feature. Further, *Tseng et al.* does not teach, show, or suggest removing the second barrier layer formed at the bottom of the feature prior to depositing a metal layer. Further, *Tseng et al.* does not teach, show, or suggest selectively depositing a metal layer on the underlayer exposed in the feature.

There is no suggestion or motivation in *Taguchi et al.* and/or *Tseng et al.* to form a feature through a barrier layer formed on a dielectric layer and through the dielectric layer, deposit a barrier layer on the bottom and sidewalls of the feature, and remove the barrier layer formed at the bottom of the feature prior to depositing a metal layer.

Additionally, *Taguchi et al.* discloses a process to improve an aluminum metallization process and *Tseng et al.* teaches an improved technique to form polysilicon contact plugs for active silicon device elements. The metal free polysilicon plug formation process of *Tseng et al.* does not address the same or similar problems in the art as disclosed in the aluminum metallization process of *Taguchi et al.* and, therefore, it would not have been obvious to modify *Tseng et al.* by *Taguchi et al.* to produce the claimed invention.

Further, modifying the aluminum metallization process of *Taguchi et al.* by the non-metal polysilicon plug formation process of *Tseng et al.* would render *Taguchi et al.* unsatisfactory for its intended purpose of forming a low oxide titanium layer on the sidewalls of a feature, and thus, destroys the *Taguchi et al.* reference. See, *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). Therefore, the combination of *Taguchi et al.* and *Tseng et al.* does not teach, show, or suggest forming a feature through a barrier layer formed on a dielectric layer and through the dielectric layer, depositing a barrier layer on the bottom and sidewalls of the feature, or removing the barrier layer formed at the bottom of the feature prior to depositing a metal layer. Withdrawal of the rejection of claims 15-18 and 23 is respectfully requested.

Claim 21 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Taguchi et al.* in view of *Tseng et al.*, and further in view of *Ho et al.* The Examiner states that it would have been obvious to modify the combination of *Taguchi et al.* and *Tseng et al.* by the copper deposition technique of *Ho et al.* Applicants respectfully traverse the rejection.

As argued above for claims 15-18 and 23, *Taguchi et al.* could not be modified by *Tseng et al.* to teach, show, or suggest the claimed invention render *Taguchi et al.* unsatisfactory for its

intended purpose of forming a low oxide titanium layer on the sidewalls of a feature.

Further, there is no suggestion or motivation in *Taguchi et al.* to modify the combination of barrier layers to improve titanium and aluminum interaction with the single barrier layer and copper deposition technique of *Ho et al. Taguchi et al.* is distinguished above. *Ho et al.* discloses the deposition of a conformal barrier seed layer over the bottom and sidewalls of an interconnect and then the deposition of a conductive material on the conformal barrier seed layer to fill the interconnect. *Ho et al.* does not teach, show, or suggest depositing a second barrier layer on the bottom and sidewalls in the feature. *Ho et al.* does not teach, show, or suggest removing a second barrier layer formed on the bottom of the feature.

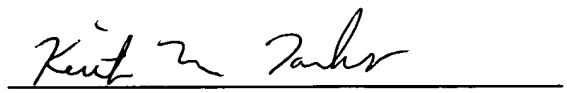
There is no suggestion or motivation in *Taguchi et al.* to modify the two barrier layer process for forming an improved titanium wetting surface for aluminum with the single barrier layer and copper deposition technique of *Ho et al.* to fill a feature in a dielectric layer as recited in claim 15 and claims dependent therefrom. There is no suggestion or motivation in *Ho et al.*, to modify a single barrier deposition technique for copper fill of a feature, with a two layer silicon nitride and titanium barrier layer process for improved aluminum deposition to teach the invention as recited in claim 15, and claims dependent therefrom.

Additionally, there is no suggestion or motivation in the *Tseng et al.* metal free polysilicon plug formation process to use the copper and tantalum metallization process of *Ho et al.* since such a modification of *Tseng et al.* would render *Tseng et al.* unsatisfactory for its intended purpose and destroy the reference. Thus, the Examiner fails to identify any suggestion or motivation in *Taguchi et al.* or *Ho et al.* to combine with *Tseng et al.* to suggest or motivate the claimed invention. Therefore, *Taguchi et al.*, *Ho et al.*, and *Tseng et al.*, neither alone nor in combination, teach, show, or suggest the claimed invention. Withdrawal of the rejection of claim 21 is respectfully requested.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the method or process of the present invention. Having addressed all issues set out in the office action, Applicants respectfully request entry of the amendment and respectfully request that the claims be allowed.

Respectfully submitted,



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